

UNIVERSAL WINDOW TIMES
JANUARY 1978 thru DECEMBER 1978

A FORTRAN IV COMPUTER
PROGRAM FOR MOON TRACKING



The following Universal Window times are based on the new specifications outlined in AS-19-12. The moon is always at a north, or positive, declination during the European Universal Window. The start of the window is two hours from the setting moon time in Frankfurt, Germany. The end of the window is when the moon sets at this same location. The level of activity in any of the windows will depend upon how reasonable the time of the day is. Early hours in the morning on working days will not be too attractive to many operators. The last hour of the window will be the most popular time for those stations with antennas pointing toward the horizon.

The times were calculated in two minute increments; therefore, there can be up to a plus or minus two minute error.

Also included are the times each month for the new moon. During the summer months the moon and sun appear to be in the same place in the sky. The sun noise can therefore mask any moonbounce signals. At least one day can be lost, and perhaps more, depending upon the directivity of the antenna arrays at both ends of the path.

<u>1978</u>	<u>New Moon</u>	<u>Perigee</u>	<u>Apogee</u>
January	9	8	21
February	7	5	17
March	9	5,31	17
April	7	26	14
May	7	24	12
June	5	21	8
July	5	19	5
August	4	17	2,29
September	2	14	26
October	2,31	11	24
November	30	5	20
December	29	2,30	18

JANUARY-1978

Day	GMT
1	0825-1025
14	2042-2242
15	2148-2348
16-17	2252-0052
18	2354-0154
19	0052-0252
20	0146-0346
21	0236-0436
22	0322-0522
23	0402-0602
24	0438-0638
25	0510-0710
26	0538-0738
27	0606-0806
28	0632-0832

FEBRUARY-1978

Day	GMT
10	1820-2020
11	1930-2130
12	2037-2237
13	2141-2341
14-15	2240-0040
16	2336-0136
17	0028-0228
18	0116-0316
19	0200-0400
20	0236-0436
21	0310-0510
22	0342-0542
23	0410-0610
24	0436-0636

MARCH-1978

Day	GMT
10	1708-1908
11	1817-2017
12	1923-2123
13	2027-2227
14	2126-2326
15-16	2221-0021
16-17	2310-0110
17-18	2355-0155
19	0034-0234
20	0109-0309
21	0141-0341
22	0210-0410
23	0238-0438
24	0305-0505

APRIL-1978

Day	GMT
6	1448-1648
7	1558-1758
8	1706-1906
9	1810-2010
10	1912-2112
11	2010-2210
12	2102-2302
13	2149-2349
14-15	2231-0031
15-16	2307-0107
16-17	2340-0140
18	0010-0210
19	0038-0238
20	0104-0304

MAY-1978

Day	GMT
3	1236-1436
4	1344-1544
5	1452-1652
6	1558-1758
7	1700-1900
8	1800-2000
9	1854-2054
10	1944-2144
11	2028-2228
12	2106-2306
13	2140-2340
14-15	2210-0010
15-16	2238-0038
16-17	2304-0104
17-18	2331-0131
31	1136-1336

JUNE-1978

Day	GMT
1	1244-1444
2	1348-1548
3	1452-1652
4	1552-1752
5	1649-1849
6	1740-1940
7	1826-2026
8	1907-2107
9	1942-2142
10	2014-2214
11	2042-2242
12	2108-2308
13	2134-2334
27	0926-1126
28	1034-1234
29	1141-1341
30	1244-1444

JULY-1978

Day	GMT
1	1345-1545
2	1442-1642
3	1536-1736
4	1624-1824
5	1707-1907
6	1744-1944
7	1818-2018
8	1847-2047
9	1914-2114
10	1939-2139
25	0822-1022
26	0930-1130
27	1036-1236
28	1138-1338
29	1237-1437
30	1332-1532
31	1421-1621

AUGUST-1978

Day	GMT
1	1506-1706
2	1544-1744
3	1620-1820
4	1651-1851
5	1718-1918
6	1744-1944
7	1810-2010
21	0559-0759
22	0712-0912
23	0821-1021
24	0927-1127
25	1028-1228
26	1125-1325
27	1216-1416
28	1303-1503
29	1344-1544
30	1420-1620
31	1452-1652

SEPTEMBER-1978

Day	GMT
1	1521-1721
2	1548-1748
3	1614-1814
18	0448-0648
19	0600-0800
20	0708-0908
21	0814-1014
22	0914-1114
23	1010-1210
24	1058-1258
25	1142-1342
26	1220-1420
27	1254-1454
28	1323-1523
29	1351-1551
30	1418-1618

OCTOBER-1978

Day	GMT
15	0224-0424
16	0338-0538
17	0448-0648
18	0556-0756
19	0700-0900
20	0758-0958
21	0850-1050
22	0938-1138
23	1018-1218
24	1052-1252
25	1124-1324
26	1152-1352
27	1219-1419
28	1244-1444

NOVEMBER-1978

Day	GMT
11	0010-0210
12	0122-0322
13	0232-0432
14	0340-0540
15	0444-0644
16	0546-0746
17	0642-0842
18	0732-0932
19	0814-1014
20	0852-1052
21	0924-1124
22	0954-1154
23	1021-1221
24	1046-1246

DECEMBER-1978

Day	GMT
9	2312-0112
10	0021-0221
11	0128-0328
12	0234-0434
13	0336-0536
14	0433-0633
15	0526-0726
16	0612-0812
17	0652-0852
18	0726-0926
19	0757-0957
20	0824-1024
21	0850-1050
22	0914-1114

A NOTE FROM STEVE POWLISHEN, K1FO (EX-WA1FFO)

For those fortunate enough to have access to a large computer with a Fortran IV compiler, I present this version of Lance Collister's program. I normally run it on an IBM 370/168. It works on either H or G compilers. On the IBM it take about 10 to 13 seconds CPU time to run four months with fifteen minute print outs.

I have also run it on an Interdata 100 with an extended Fortran compiler.

I developed this version from Lance Collister's original program and a DEC compatible Fortran version I got from Larry Blouin, K1MNS.

COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
SOURCE,BCD,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF

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ISN 0002      REAL NO,NEST
ISN 0003      DATA NO/'NO'/,YES/'YES'/,BLANK/' '/,UW/'UW'/
ISN 0004      FNA(X)=INT(X*DEG*10.0+.5)/10.0
ISN 0005      FNC(X)=(X-INT(X))*TUPI
ISN 0006      TUPI=2.0*3.141592
ISN 0007      RAD=TUPI/360.0
ISN 0008      DEG = 360.0/TUPI
ISN 0009      WRITE (4,601)
ISN 0010      601 FORMAT (' WHAT IS LATITUDE IN DEG. MIN.(+FOR NORTH) ')
ISN 0011      READ (5,611) ULATD,ULATM
ISN 0012      611 FORMAT (2F7.2)
ISN 0013      WRITE (4,621)
ISN 0014      621 FORMAT (' WHAT IS LOGITUDE IN DEG. MIN.(+FOR WEST) ')
ISN 0015      READ (5,611) ULOND, ULONM
ISN 0016      ULATD = (ULATD+ULATM/60.0)*RAD
ISN 0017      ULOND = (ULOND+ULONM/60.0)*RAD
ISN 0018      WRITE (4,631)
ISN 0019      631 FORMAT (' DO YOU WANT PRINTOUT ONLY NEAR HORIZON ? ')
ISN 0020      READ (5,632) ANS1
ISN 0021      632 FORMAT (A3)
ISN 0022      IF (ANS1.EQ.NO) GO TO 637
ISN 0024      634 FORMAT ('BELOW WHAT ELEV. DO YOU WANT PRINTOUT ? ')
ISN 0025      READ (5,635) BELEV
ISN 0026      635 FORMAT (F6.2)
ISN 0027      GO TO 638
ISN 0028      637 BELEV = 100.0
ISN 0029      638 WRITE (4,639)
ISN 0030      639 FORMAT (' DO YOU WANT PRINTOUT ONLY DURING NORTH DEC.? ')
ISN 0031      READ (5,632) ANS2
ISN 0032      WRITE (4,640)
ISN 0033      640 FORMAT (' DO YOU WANT PRINTOUT ONLY DURING UNIV.WINDOW?')
ISN 0034      READ (5,632) ANS3
ISN 0035      WRITE (4,641)
ISN 0036      641 FORMAT (' DO YOU WANT PRINTOUT ONLY DURING SPECIFIC TIME?')
ISN 0037      READ (5,632) ANS4
ISN 0038      IF (ANS4.EQ.NO) GO TO 650
ISN 0040      WRITE (4,646)
ISN 0041      646 FORMAT (' WHAT ARE THE GMT BEGINNING & ENDING TIMES ? ')
ISN 0042      READ (5,648) B1,E
ISN 0043      648 FORMAT (2F5.0)
ISN 0044      GO TO 660
ISN 0045      650 B1=0000.0
ISN 0046      E=2400.0
ISN 0047      660 WRITE (4,661)
ISN 0048      661 FORMAT (' WHAT IS THE DESIRED PRINTOUT IN MINUTES ? ')
ISN 0049      READ (5,663) DINC
ISN 0050      663 FORMAT (F4.0)
ISN 0051      WRITE (4,664)
ISN 0052      664 FORMAT (' HOW MANY ESTIMATED POSITIONS BETWEEN CALC.? ')
ISN 0053      READ (5,663) NEST
ISN 0054      WRITE (4,666)
ISN 0055      666 FORMAT (' WHAT IS BEGINNING DATE (MM,DD,YYYY)? ')
ISN 0056      READ (5,668) AM1,AD1,AY1
ISN 0057      668 FORMAT (2F3.0,F5.0)

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ISN 0058      CALL JULIAN (AM1,AD1,AY1,BJUL)
ISN 0059      WRITE (4,671)
ISN 0060      671 FORMAT (' WHAT IS ENDING DATE (MM,DD,YYYY)? ')
ISN 0061      READ (5,668) EM,ED,EY
ISN 0062      CALL JULIAN (EM,ED,EY,EJUL)
ISN 0063      WRITE (6,672)
ISN 0064      672 FORMAT (1H1)
ISN 0065      DATEJ=BJUL
ISN 0066      680 CONTINUE
ISN 0067      FLAG1=2.0
ISN 0068      B=B1
ISN 0069      T1=DATEJ-17472.5
ISN 0070      1000 DIF1=((B-INT(B/100.0+.5)*100.0)+INT(B/100.0+.5)*60.0)
                1-((E-INT(E/100.0+.5)*100.0)+INT(E/100.0+.5)*60.0)
ISN 0071      IF (DIF1) 1060,1060,1054
ISN 0072      1054 IF (DIF1-DINC) 1055,2000,2000
ISN 0073      1055 B=E
ISN 0074      C      CALCULATION OF LATITUDE & LONGITUDE OF MOON
                1060 T=(B-INT(B/100.0)*100.0)/1440.0+INT(B/100.0)/24.0
ISN 0075      C      T=FRACTION OF THE DAY
                IF (FLAG1-2.0) 1070,1200,1200
ISN 0076      1070 IF (FLAG2-NEST) 1080,1200,1200
ISN 0077      1080 FLAG2 = FLAG2 + 1.0
ISN 0078      GHA = GHA + .41645E-2*DINC
ISN 0079      GO TO 1515
ISN 0080      1200 FLAG2 =0.0
ISN 0081      T5= T1+T
ISN 0082      D1=FNC(.751213+.0366011*T5)
ISN 0083      D2=FNC(.822513+.0362916*T5)
ISN 0084      D3=FNC(.995766+.00273778*T5)
ISN 0085      D4=FNC(.974271+.0338632*T5)
ISN 0086      D5=FNC(.0312525+.03674819*T5)
ISN 0087      DLON=D1+.658*RAD*SIN(2.0*D4)+6.289*RAD*SIN(D2)
                1-1.274*RAD*SIN(D2-2.0*D4)-.186*RAD*SIN(D3)
                2+.214*RAD*SIN(2.0*D2)-.114*RAD*SIN(2.0*D5)
                3-.059*RAD*SIN(2.0*D2-2.0*D4)-.057*RAD*SIN(D2+D3-2.0*D4)
ISN 0088      S=D5+.6593*RAD*SIN(2.0*D4)+6.2303*RAD*SIN(D2)
                1-1.272*RAD*SIN(D2-2.0*D4)
ISN 0089      DLAT =5.144*RAD*SIN(S)-.146*RAD*SIN(D5-2.0*D4)
ISN 0090      C      CALCULATION OF RIGHT ASCENSION AND DECLINATION
ISN 0091      DEC1=COS(DLAT)*SIN(DLON)*.397821+SIN(DLAT)*.917463
ISN 0092      DEC2=ABS(DEC1)
ISN 0093      DEC=ATAN2(DEC1,(SQRT(1.0-DEC2**2.0)))
ISN 0095      IF ((DEC.LT.0.0).AND.(ANS2.EQ.YES)) GO TO 2000
ISN 0096      RAC =COS(DLAT)*COS(DLON)/COS(DEC)
ISN 0098      IF (((DEC*DEG).LT.12.0).AND.(ANS3.EQ.YES)) GO TO 2000
ISN 0099      RAS=(COS(DLAT)*SIN(DLON)*.917463-SIN(DLAT)*.397821)/COS(DEC)
ISN 0100      RA= ATAN2(RAS,RAC)
ISN 0101      IF (RA) 1500,1510,1510
ISN 0102      1500 RA = TUPI + RA
ISN 0103      C      CALCULATION OF LOCAL SIDEREAL TIME
ISN 0104      1510 DLST = .0657098*T1
ISN 0105      DLST=T*24.0*1.002738+6.646055+(DLST-INT(DLST/24.0)*24.0)
                DLST=(DLST-INT(DLST/24.0)*24.0)
ISN 0106      C      CALCULATION OF GHA FROM LOCAL SIDEREAL TIME
ISN 0107      GHA=(DLST/24.0)*TUPI-RA

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ISN 0106      1515 IF (GHA) 1520,1530,1530
ISN 0107      1520 GHA=GHA+TUPI
ISN 0108      1530 IF (GHA-TUPI) 1550,1550,1540
ISN 0109      1540 GHA=GHA-TUPI
ISN 0110      1550 IF((((DEC*DEG).GE.(0.00)).AND.((DEC*DEG).GE.(.642857*GHA
1*DEG-49.75))).AND.(((DEC*DEG).LE.(24.5)).AND.((DEC*DEG).LE.
2(.642857*GHA*DEG-33.11)))) GO TO 1555
ISN 0112      SPAC2=BLANK
ISN 0113      IF (ANS3 .EQ. YES) GO TO 1800
ISN 0115      GO TO 1565
ISN 0116      1555 SPAC2=UW
C
ISN 0117      1565 UHA = ULOND-GHA
ISN 0118      ELSIN=COS(ULATD)*COS(UHA)*COS(DEC)+SIN(DEC)*SIN(ULATD)
ISN 0119      ELCOS = SQRT(1.0-(ABS(ELSIN)**2.0))
ISN 0120      EL = ATAN2((ELSIN-(1.0/61.33)),ELCOS)
ISN 0121      FEL = ATAN2(ELSIN,ELCOS)
ISN 0122      IF (EL) 1800,1566,1566
ISN 0123      1566 IF (EL*DEG-BELEV) 1567,1567,1800
ISN 0124      1567 AZCOS=SIN(DEC)/(COS(ULATD)*COS(FEL))
1-(SIN(ULATD)/COS(ULATD))*(SIN(FEL)/COS(FEL))
ISN 0125      AZSIN=SIN(ULATD)*SIN(DEC)+COS(ULATD)*COS(DEC)*COS(UHA)
ISN 0126      AZSIN=(SIN(UHA)*COS(DEC))/SQRT(1.0-(ABS(AZSIN)**2.0))
ISN 0127      AZ=ATAN2(AZSIN,AZCOS)
ISN 0128      IF (AZ) 1568,1568,1580
ISN 0129      1568 AZ=AZ+TUPI
ISN 0130      1580 IF (FLAG1-2.0) 1600,1585,1585
ISN 0131      1585 IAM1=INT(AM1)
ISN 0132      IAD1=INT(AD1)
ISN 0133      IAY1=INT(AY1)
ISN 0134      IAY1=IAY1-1900
ISN 0135      WRITE (6,1587) IAM1,IAD1,IAY1
ISN 0136      1587 FORMAT ('1',T2,I2,'/',I2,'/',I2,' GMT',T18,'AZIMUTH',T32,
1'ELEVATION',T50,'GHA',T61,'DECLINATION'/T1,'-----',T18,
2'-----',T32,'-----',T48,'-----',T61,'-----')
ISN 0137      1600 IF ((T-FLAG1)-(2.0*DINC)/1440.0) 1620,1615,1615
ISN 0138      1615 WRITE (6,1616)
ISN 0139      1616 FORMAT (1H )
ISN 0140      1620 NB=INT(B*10.0+.5)/10
ISN 0141      1650 AZP = FNA(AZ)
ISN 0142      ELP = FNA(EL)
ISN 0143      GHAP= FNA(GHA)
ISN 0144      DECP= FNA(DEC)
ISN 0145      IF (NB.GE.1000) GO TO 1625
ISN 0147      IF (NB.GE.100) GO TO 1630
ISN 0149      IF (NB.GE.10) GO TO 1635
ISN 0151      IF (NB.GE.1) GO TO 1640
ISN 0153      WRITE (6,1621) SPAC2,AZP,ELP,GHAP,DECP
ISN 0154      1621 FORMAT (1H ,T5,'0000',T11,A2,T18,F6.1,T34,F5.1,T48,F6.1,T64,F5.1)
ISN 0155      GO TO 1680
ISN 0156      1625 WRITE (6,1626) NB,SPAC2,AZP,ELP,GHAP,DECP
ISN 0157      1626 FORMAT (1H ,T5,T4, T11,A2,T18,F6.1,T34,F5.1,T48,F6.1,T64,F5.1)
ISN 0158      GO TO 1680
ISN 0159      1630 WRITE (6,1631) NB,SPAC2,AZP,ELP,GHAP,DECP
ISN 0160      1631 FORMAT (1H ,T5,'0',I3,T11,A2,T18,F6.1,T34,F5.1,T48,F6.1,T64,F5.1)
ISN 0161      GO TO 1680

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ISN 0162      1635 WRITE (6,1636) NB,SPAC2,AZP,ELP,GHAP,DECP
ISN 0163      1636 FORMAT (1H,T5,'00',I2,T11,A2,T18,F6.1,T34,F5.1,T48,F6.1,T64,F5.1)
ISN 0164      GO TO 1680
ISN 0165      1640 WRITE (6,1641) NB,SPAC2,AZP,ELP,GHAP,DECP
ISN 0166      1641 FORMAT(1H,T5,'000',I1,T11,A2,T18,F6.1,T34,F5.1,T48,F6.1,T64,F5.1)
ISN 0167      1680 FLAG1=T
ISN 0168      1800 B=INT((B+DINC)*1000.0+.5)/1000.0
ISN 0169      Z=((B-INT(B/100.0)*100.0)-60.0)
ISN 0170      IF (Z) 1000,1820,1820
ISN 0171      1820 B=INT(B/ 100.0)*100.0+100.0+Z
ISN 0172      GO TO 1000
ISN 0173      2000 CALL DATE (AM1,AD1,AY1,AM1,AD1,AY1)
ISN 0174      DATEJ=INT(ATEJ*10.0+.5)/10.0
ISN 0175      DATEJ=DATEJ+1
ISN 0176      IF(DATEJ.LE.EJUL)GO TO 680
ISN 0178      2100 CONTINUE
ISN 0179      STOP
ISN 0180      END

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COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
SOURCE,BCD,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF

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ISN 0002      SUBROUTINE JULIAN(AM,AD,AY,DATEJ)
C             CALCULATES JULIAN DATE MINUS 2397547.5 FOR ZERO HOURS GMT
ISN 0003      IF ((AY-1853.0)/4.0-11.0) 8050,8030,8030
ISN 0004      8030 C1 =-1.0
ISN 0005      GO TO 8060
ISN 0006      8050 C1 = 0.0
ISN 0007      8060 IF (AM-9.0) 8070,8100,8070
ISN 0008      8070 IF (AM-11.0) 8080,8100,8080
ISN 0009      8080 C2 = 0.0
ISN 0010      GO TO 8110
ISN 0011      8100 C2 = 1.0
ISN 0012      8110 IF (AM-3.0) 8120,8150,8150
ISN 0013      8120 DATEJ=365.0*(AY-1853.0)+AD+30.0*(AM+9.0)+INT((AM+10.0)/2.0)
             1+INT((AY-1853.0)/4.0)+1.0+C1
             GO TO 8170
ISN 0014      8150 DATEJ=365.0*(AY-1852.0)+AD+30.0*(AM-3.0)+INT((AM-2.0)/2.0)
             1+INT((AY-1852.0)/4.0)+C1+C2
ISN 0016      8170 CONTINUE
ISN 0017      RETURN
ISN 0018      END

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COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
SOURCE,BCD,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF

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ISN 0002      SUBROUTINE DATE (AM1,AD1,AY1,DM1,DD1,DY1)
C             INCREMENTS DAY AND CORRECTS FOR MONTH AND YEAR
ISN 0003      IF (AD1-28.0) 8480,8330,8330
ISN 0004      8330 IF (AM1-2.0) 8380,8340,8380
ISN 0005      8340 IF (400.0*INT(AY1/400.0)-AY1) 8350,8370,8350
ISN 0006      8350 IF (100.0*INT(AY1/100.0)-AY1) 8360,8450,8360
ISN 0007      8360 IF (4.0*INT(AY1/4.0)-AY1) 8450,8370,8450
ISN 0008      8370 IF (AD1-29.0) 8480,8450,8450
ISN 0009      8380 IF (AD1-30.0) 8480,8390,8430
ISN 0010      8390 IF (AM1-4.0) 8400,8450,8400
ISN 0011      8400 IF (AM1-6.0) 8410,8450,8410
ISN 0012      8410 IF (AM1-9.0) 8420,8450,8420
ISN 0013      8420 IF (AM1-11.0) 8480,8450,8480
ISN 0014      8430 IF (AM1-12.0) 8450,8440,8450
ISN 0015      8440 AY1 = INT((AY1+1.0)*100.0+.5)/100.0
ISN 0016      AM1 = 0.0
ISN 0017      8450 DD1 = 1.0
ISN 0018      DM1 = AM1+1.0
ISN 0019      GO TO 8500
ISN 0020      8480 DD1 = AD1+1.0
ISN 0021      DM1 = AM1
ISN 0022      8500 DY1 = AY1
ISN 0023      RETURN
ISN 0024      END

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WHAT IS LATITUDE IN DEG. MIN.(+FOR NORTH)
 WHAT IS LOGITUDE IN DEG. MIN.(+FOR WEST)
 DO YOU WANT PRINTOUT ONLY NEAR HORIZON ?
 DO YOU WANT PRINTOUT ONLY DURING NORTH DEC.?
 DO YOU WANT PRINTOUT ONLY DURING UNIV.WINDOW?
 DO YOU WANT PRINTOUT ONLY DURING SPECIFIC TIME?
 WHAT IS THE DESIRED PRINTOUT IN MINUTES ?
 HOW MANY ESTIMATED POSITIONS BETWEEN CALC.?
 WHAT IS BEGINNING DATE (MM,DD,YYYY)?
 WHAT IS ENDING DATE (MM,DD,YYYY)?

5/ 1/77 GMT	AZIMUTH	ELEVATION	GHA	DECLINATION
0000	133.1	32.3	34.7	-3.5
0015	136.8	34.2	38.3	-3.5
0030	140.8	36.0	42.0	-3.6
0045	144.8	37.6	45.5	-3.6
0100	149.1	39.0	49.2	-3.7
0115	153.5	40.3	52.8	-3.7
0130	158.2	41.4	56.5	-3.8
0145	162.9	42.3	60.0	-3.8
0200	167.8	42.9	63.7	-3.9
0215	172.7	43.3	67.3	-3.9
0230	177.8	43.4	70.9	-4.0
0245	182.8	43.4	74.5	-4.0
0300	187.7	43.1	78.1	-4.1
0315	192.6	42.6	81.7	-4.1
0330	197.5	41.8	85.3	-4.2
0345	202.1	40.9	88.9	-4.2
0400	206.7	39.6	92.6	-4.3
0415	211.0	38.3	96.2	-4.3
0430	215.2	36.7	99.8	-4.3
0445	219.2	35.1	103.4	-4.3
0500	223.0	33.2	107.1	-4.4
0515	226.6	31.3	110.6	-4.4
0530	230.1	29.2	114.3	-4.5
0545	233.4	27.1	117.9	-4.5
0600	236.6	24.8	121.5	-4.6
0615	239.6	22.5	125.1	-4.6
0630	242.5	20.0	128.8	-4.7
0645	245.3	17.6	132.4	-4.7
0700	248.0	15.0	136.0	-4.8
0715	250.7	12.5	139.6	-4.8
0730	253.2	9.8	143.3	-4.9
0745	255.7	7.3	146.8	-4.9
0800	258.1	4.6	150.4	-5.0
0815	260.5	2.0	154.0	-5.0
2200	102.6	1.5	352.8	-7.6
2215	105.0	4.1	356.4	-7.6
2230	107.6	6.7	0.0	-7.7
2245	110.1	9.2	3.6	-7.7
2300	112.8	11.7	7.3	-7.8
2315	115.5	14.1	10.8	-7.8
2330	118.3	16.5	14.5	-7.9
2345	121.2	18.8	18.1	-7.9
2400	124.2	21.0	21.6	-8.0